# Digital Dilemmas: The Unintended Consequences of Election Technology

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There has been a remarkable uptake in the deployment of digital technologies in elections over the last two decades – a trend that is clearest in Africa and Asia. In Africa roughly half of all national level elections now involve digital equipment of some form, most notably biometric voter registration/identification and electronic results transmission.[1] The stated driver for this has been similar everywhere: in circumstances where elections are problematic – because of malpractice, or procedural problems, or both – digital technology is seen as a fix, able to compensate for the weakness of the state and to deter malpractice by politicians and officials. The hope is that new technology will enhance the electoral environment in three main ways: by making the functioning of the electoral commission more robust and efficient, by reducing the scope for electoral manipulation, and by generating greater clarity and transparency regarding election outcomes. On this basis, the proponents of new technology also expect it to boost the process's legitimacy – and hence that of the elected government.

Yet, while there are clearly cases in which such technologies guard against malpractice and boost public confidence in the short-term, there are also examples in which they prove to be ineffective. Recent experience suggests that such technology relies on complex procedures that are liable to breakdown, may actually increase popular suspicion of manipulation, and encourage complacency towards traditional forms of election oversight. Given this, when considering which types of digitization are worth the cost, it is important that greater attention is paid to the limitations and unintended consequences of new electoral technology.

Digital technologies can of course be used in many ways in elections, including new communication technologies such as Whatsapp. However, our focus is solely on the digital technologies deployed by electoral commissions: those associated with electronic voter

registration, voter verification, and results transmission. We are not the first researchers to question the rush to these new ways of running elections. A number of papers by practitioners have been published in this area, including two edited collections. The first, curated by Michael Yard of the International Foundation for Electoral Systems (IFES), addresses the "progress and pitfalls" of new technology deployed by state electoral commissions.[2] In particular, Yard helpfully distinguishes electoral efficiency from electoral transparency and argues that while technology can help to achieve both goals, it tends to be implemented in a way that promotes the former over the latter. By creating "black box" components that "lead to more efficient development and employment", he argues, new technology risks transferring power "away from the many" into the "hands of the few".[3]

A second collection edited by Astrid Evrensel echoes many of Yard's points, while also emphasising the "organization and logistical challenges" that new technology can generate.[4] The analysis of Evrensel and her colleagues is particularly significant because it highlights the heavy dependence of electoral commissions on the support and expertise provided by the international community, who often help to both fund and procure digital equipment. As Akumiah notes with reference to the Democratic Republic of Congo (DRC), this raises serious questions about the long-term sustainability of the "digital revolution".[5]

A number of other publications have identified similar challenges. Joel Barkan argues that new technology in Africa often fails because insufficient attention is paid to the broader management structures it needs to function.[6] In other contexts, studies have questioned the cost of digital solutions and highlighted how automation can improve the efficiency of one aspect of the electoral process[7] but leave other major issues, such as voter intimidation, unaddressed.[8] Worse still, digital technology can encourage a narrow focus on particular parts of the electoral process to the neglect of the broader political environment and campaigns – a point acknowledged even by some enthusiasts.[9]

We build on these existing discussions to develop our own critique. More specifically, we draw on Yard's discussion of the "undemocratic" elements of election technology to demonstrate how the complex science that underpins digital processes can render elections less transparent, and follow Evrensel and Akumiah in stressing the international dimension of the spread of new technology.[10] However, we also seek to go beyond these studies in three important ways. First, the analysis contained in Yard and Evrensel's collections is now seven years old, and so does not cover the recent wider rush to digital technology. As a result, these

authors did not focus on the central question animating our analysis: why has the spread of digital technology gathered pace at the same time that evidence of its limitations has become ever more apparent? By bringing the story up-to-date, we are able to advance a new explanation of these contradictory trends.

Our second contribution is to refocus the debate on the political, rather than the logistical, barriers to the effective deployment of new technology. While some important journal articles have been published more recently – such as Piccolino's analysis of Cote d'Ivoire and Ghana and Debos' work on Chad[11] – they have tended to adopt a relatively narrow focus, addressing a particular aspect of the electoral process in one or two cases. At the same time, the wider literature has mainly focused on procedural challenges, paying less attention to the political context within which technology is introduced. By contrast, we seek to place political factors centre-stage, considering how the quality of democracy and the independence of the electoral commission impacts on the performance of new technologies. Unsurprisingly, we find that the greatest gains from digitization come in countries where the quality of democracy is higher and the electoral commission more independent. This is significant, because it implies that new technology is likely to be least effective where it is most needed. As John Githongo, Kenya's former anti-corruption tsar, put it: "you cannot digitize integrity".[12]

The third contribution of this paper is to demonstrate how new technology may have damaging effects even when it generates procedural improvements in the way that elections are run. While Yard pointed to the way that election technology can empower a small technocratic elite, and Gonggrijp and colleagues have found that digital processes may become a source of mistrust,[13] neither fully explores the way in which this can undermine domestic and international confidence in electoral outcomes.

Investigating the effectiveness of new technology is complicated by the fact that it is expected to achieve a number of different ends, and the difficulty of establishing criteria for judging whether an intervention has been "effective". As an extensive literature has addressed issues of logistical capacity, we focus our efforts on the capacity of digital processes to render elections cleaner, more transparent, and hence legitimate. We draw on data from a wide range of sources, including election observation reports from around the world that typically feature evaluations of the performance of electoral commissions; public opinion surveys that provide insights into the attitudes of ordinary voters; the statements and

behaviours of elite actors that give a sense of the beliefs of political leaders; and, our direct experience of watching elections in Ghana, Kenya, Nigeria, and Uganda. These cases have been selected because they have very similar electoral systems, having been former British colonies, but vary considerably when it comes to the quality of democracy and electoral management, allowing us to investigate the impact of these factors on digital processes. Instead of specifying an arbitrary threshold for 'effectiveness', we ask whether there was meaningful improvement – i.e. changes in the logistical management and transparency of the process that were sufficient to impact on the overall quality of the elections – and whether this can be attributed to the use of new technology. Focussing on improvement over time at the country level has the advantage of accounting for the conditions on the ground in each case, rather than seeking to impose an ideal standard.

We build our argument in five stages. The first section discusses the drivers of new technology. In particular, we highlight two issues that have yet to be fully addressed in the literature: the tendency of a range of influential actors to fetishize digitization technology, and the way in which the high cost of new technology generates rent-seeking opportunities, which in turn help to explain its popularity. In the second section, we draw attention to another aspect of the 'digital fallacy': the widespread belief that technologies will resolve logistical challenges and promote electoral quality and transparency. Finally, we identify a further unintended consequence of the introduction of digital technology that is often overlooked; namely, that it tends to distract opposition parties from focusing on effectively deploying party agents and leads to funds being directed away from the provision of domestic monitors, leaving other parts of the system more vulnerable – especially if digital processes break down. By evaluating new technology in terms of the "opportunity cost" that it represents, we highlight its true implications.

Taken together, the evidence presented in this article suggests that, while digitization may be unstoppable, its impact in the world's new democracies is likely to be mixed. In more democratic contexts such as Ghana, new technology has realised some of the gains advertised by its proponents. But in the more difficult cases such as Kenya, where compromised electoral commissions operate in semi-authoritarian contexts, the introduction of new technology has generated few benefits. This is not to say that digital technology is always to blame for electoral controversies. In many of the cases we cover, elections would probably not have been significantly better in the absence of digitization. But digital electoral technologies are

expensive: they must deliver real benefits to be worth that cost. Given this, their adoption needs to be carefully assessed on a case-by-case basis. At present, digitization is being pursued in many countries that lack the political will and institutional framework necessary for it to function effectively.

**Explaining the digitization drive: fetishization and rent seeking**

National elections by secret ballot and adult suffrage necessarily involve the processual combination of particular techniques, and devices – from the pens and indelible ink used to mark ballot papers and voters' fingers to voter identification cards and ballot papers:[14] what we have elsewhere called the "voting machine".[15] Elections have thus always involved technological innovation of a sort, and non-digital technologies were novel to many of those who organized and participated in the electoral process when it was first introduced. However, in recent decades the equipment used during elections has become increasingly hi-tech. Biometric registration records voters' fingerprints, faces and/or other bio-data; biometric identification verifies this data electronically at the polling station to clear an individual to vote; and, Direct Recording Electronic (DRE), Optical Mark Recognition (OMR) and Optical Character Recognition (OCR) systems offer alternative technologies for recording voter choice. Finally, there are electronic systems – often based on mobile phone applications – for counting and collating votes.

Latin America led the way in many of these innovations; beginning with a "computerized voting pilot" in Colombia in 1992, soon followed by a computerized registration system linked to a photographic identification card with a barcode.[16] In 1998, voters in Brazil cast their ballots via "computers connected to a secure local area network". Subsequently, Venezuela introduced the scanning of ballots and electronic transmission of results.[17] The accelerating spread of these technologies to other parts of the world – particularly Asia and sub-Saharan Africa – has had multiple drivers. Civil society groups and opposition parties, bilateral and international agencies for electoral support, electoral management bodies and incumbent regimes have all supported this trend – indeed, sometimes they have demanded new technologies. The motives of these groups are varied, and have included the fact that similar developments have helped to strengthen potentially

vulnerable electoral systems in important "test cases", such as India. Voting has been conducted electronically in the world's largest democracy since 1999, and although concerns remain that these machines are vulnerable to hacking,[18] some commentators have credited them with increasing public confidence in the electoral process.[19] However, it is also true that popular and policy debates about digitization tend to share another consistent element: all involve a degree of fetishization, crediting technologies "with powers they do not have (e.g., the ability to solve social problems, to keep the economy vibrant, or to provide us with a superior life)".[20]

The "biometrics revolution", as enthusiasts call it, promises developmental transformation.[21] The websites of companies that market these technologies foreground this fetishization, imputing to their devices an innate power that transcends politics and human agency. Their self-presentation emphasizes modernity, offering "clear processes, supported by state-of-the-art technology".[22] They rhetorically lament the backwards state of many electoral processes and worry that "[t]echnology has revolutionized so many aspects of our lives – services, lifestyles and living standards but elections have been left behind".[23] These narratives cast digital technologies as "anti-politics" machines, providing simple technical solutions to complex social and political problems.[24] For the public and civil society, the technology companies promise to enable "citizens to access services and exercise their rights securely and easily", and for governments and electoral management bodies they offer a vision of panoptical modern stateness: "helping governments manage the civil identity cycle in the increasingly mobile and globalized world of the 21st century".[25] For international or bilateral agencies, meanwhile, technologies provide a way to channel electoral support towards procedural issues that may allow them to avoid accusation of partisanship and neo-colonialism.[26]

Some visions of the modern are, straightforwardly, marketing strategies by technology companies. For example, one major player in the field has sponsored an "International Elections Advisory Council", composed of retired national election officials, to promote the idea that digital technology offers a ready solution to electoral challenges. In one of the Council's publications, a former South African electoral commissioner describes how digital technologies "leapfrogged [voting] to the brink of the twenty-first century".[27]

As self-serving as such strategies may be, these companies are exploiting wider attitudes, not creating them. Indeed, it is important not to understate the allure of new

technologies of identification for the citizen, for whom biometric voters' cards and the like offer a way to make claims on the state or to renegotiate social status.[28] Mobile phones have created new economic and social opportunities in countries around the world – it is not surprising that many voters believe that similar technology can have a transformative impact on elections. As one elections expert who has worked for international observation missions in over fifteen countries put it:

> "… you get this almost blind faith that technology will make everything better, even though it can be extremely difficult to introduce … it is almost as if there is a suspension of disbelief because donors and opposition leaders are so desperate for something – anything – to fix the process".[29]

This confidence often extends to the mass public. In Kenya, for example, a nationally representative survey conducted by Ipsos in early October 2017 found that 58% of respondents agreed that "Elections that use digital technology are *always* more free and fair" (emphasis added). This is despite the fact that, as we shall see, the widespread use of digital technology in the presidential poll of 8 August 2017 did not prevent it from being found to be "illegal, null and void" by the Supreme Court. In other words, the effectiveness of the kind of marketing described above reflects the wider appeal of digital technologies and the persistent power of modernity; in one study in the US, voters expressed a preference for new voting technologies in the (un-evidenced) belief that they were more robust.[30]

This process is not unique, nor disconnected from other developmental trends, but rather reflects a much broader tendency to overlook the potential limitations of new technology when it comes to transforming lives in the global south – and, indeed, the global north. As David Harvey has argued, "[a]ll manner of social actors (corporations, entrepreneurs, and various branches of government, most particularly the military) endow technology with causative powers to the point that they will uncritically—and sometimes disastrously—invest in it in the naive belief that it will somehow provide solutions to whatever problems they are encountering".[31] In a sense, this argument is an extension of James Scott's famous critique of high modernism, as a "form of modernity, characterized by an unfaltering confidence in science and technology as means to reorder the social and natural world".[32] Scott argues that seeing the world through this lens is deeply problematic because placing

too much confidence in new scientific discoveries means that the potential flaws in technology are not detected, leading to developmental disasters.

Recent research has often echoed this analysis. Writing about the World Summit on Information Technology, an event supported by the United Nations General Assembly in 2003 and 2005 that involved 50 heads of state/government and vice-presidents,[33] Marc Raboy records that the days leading up the event "were marked by almost surrealist fetishization of technology".[34] Similarly, Shahid Alv, discussing the use of technology in education, urges caution and argues that the importance of local context is too often "ignored or downplayed in the rush to fetishize technology".[35] Moving back to the realm of elections, the great confidence placed in digitization means that the successes of new technology have often been championed while its failures are overlooked. As a well-travelled elections expert who has worked for IFES – a company that often advises electoral commissions on these processes – put it:

> "You go to so many countries where everyone has this incredible confidence in the potential of technology … even when the ruling party has no interest in free and fair elections. It makes you want to shout … 'just digitizing things is not going to save you' … and it is going to cost a lot [of money]."[36]

In Ghana, biometric registration and identification were introduced for elections in 2012. In the context of chronic complaints over the accuracy of the voting register, the combined system of registration and verification was presented as a qualified success.[37] In practice, however, there were multiple problems, most notably that in some cases verification devices failed to identify individuals' thumbprints, or failed entirely.[38] Subsequent research indicated that machines were more likely to fail where no observers were present, and that machine failure was correlated with over-voting.[39] These anomalies did not become major issues partly because another, more pressing issue of credibility arose – over vote-tallying and recording[40] – distracting attention from them. Despite this uncertain experience, neither candidates nor officials (nor the donors who had supported their introduction) questioned the inherent value of digital technologies.[41] Indeed, one politician explicitly saw this as a step on the way to even more technology – an understanding apparently linked to a mistaken belief regarding how European elections are run:

> … we are only praying that a day may come when we will do e-voting. Not e-transmission but e-voting. I was in UK … you put your card there it makes a sound, nobody, there's no agent, nobody is there at the polling centre.[42]

In describing this attachment to technology as fetishization, we do not mean to understate the genuine potential of digital technologies. Where voters' rolls have been bloated by multiple registration, biometric registration may significantly reduce them. Where the presence of large numbers of 'ghost' voters – deceased, or moved elsewhere – has created space for rigging through impersonation, biometric voter identification can provide an effective check on fraud. As the Commonwealth Observer Group opined after Nigeria's 2015 elections: "… the introduction of biometric Permanent Voter Cards is, in our view, a major factor in enhancing the integrity of the electoral process".[43]

However, it is clear that the introduction of new technology cannot fully safeguard an election because some irregularities – such as gerrymandering, the intimidation of voters, and voter bribery – cannot be prevented by digitization.[44] Moreover, even in the areas in which such technologies have the greatest transformative potential, they cannot do this work by themselves; rather, their efficacy is dependent on effective implementation. Biometric technology cannot prevent multiple registration if the data is not audited to prevent duplication, as was evidenced by widespread and reportedly flagrant biometric multiple registration in Somaliland in 2008.[45] Similarly, an audit ahead of the 2011 elections in the DRC found 700,000 so-called "doublons" – multiple registrations – but officials ruled that "it was too late to clean up the roll".[46]

The potential for technology to be manipulated – or to simply break down – are rarely publicly admitted by those who seek to promote the its use. Yet stories along these lines are easy to find if you look for them. For example, while the peaceful transfer of power in the Nigerian polls of 2015 has been claimed as a triumph for digitization,[47] many parts of the process did not function as intended. Most notably, 91 per cent of the machines failed to consistently verify voter identity in the presidential poll according to EU observers.[48] Thus, in Nigeria, as in so many other cases, the public image of technology does not reflect the reality.

A deep faith in modernity is not the only driver of the digitization of elections. Those who are involved in the design and procurement of new technology may also have a more

cynical motivation: personal or corporate financial gain. The vast cost of new technology, and the fact that it involves purchasing large amounts of expensive equipment, makes it a classic target for rent-seeking activities. Given that digitization is often attempted in contexts in which there are often weak checks and balances against corrupt activity, it is unsurprising that it has often been accompanied by financial scandals involving multinational companies and host governments.

The cost of implementing biometric verification software is often particularly burdensome, because one kit needs to be purchased for each polling station. In Kenya in 2013 the "total cost of all the computers, mobile phones, and accessory equipment" alone – not including the Independent Electoral and Boundary Commission's (IEBC) other operating costs – was estimated at US$120 million, or US$10 for each voter.[49] Ahead of the DRC's 2005 election: "A staggering US$40,160,000 was needed to buy the 10,000 biometric registration kits and to have them transported … to Kinshasa."[50] Beyond the cost of the equipment itself, the need to distribute the machines around the country, and to pay for staff training and maintenance – in addition to the challenge of keeping equipment up-to-date – compounds the problem. Just four years after the initial procurement in Kenya, the IEBC purchased an entirely new "integrated electoral management system", at a cost that is estimated to be over EUR 40 million. Biometric registration is usually cheaper, because a smaller number of kits can be used to cover a larger area, but is still costly. For example, the use of new technology raised the cost of the registration process to US$9 per person in Nigeria and US$20 per person in Afghanistan.[51]

It is the high cost of election technology, and the fact that it tends to be introduced in poorer countries, that has made many new democracies increasingly dependent on international support to run elections, as argued by Evrensel and Akumiah. For example, when Somaliland acquired what was touted to be the most advanced voter registration and identification system in the world in 2016, this was only possible because international donors picked up the EUR 13.5 million bill – more than EUR 10 per voter.[52] As the UN Secretary-General bemoaned in 2009, "Some of the poorest countries in the world have chosen some of the most expensive electoral processes and technology. ... I am concerned about techniques and systems that might cause a State, in the conduct of its own elections, to be financially dependent on donors".[53] Moreover, this often generates a complex triangle of economic relations between the donors who finance new technology, the government or

electoral officials who procure it, and the international companies that provide it. In this set of relationships, donors can gain by using their leverage to ensure that key contracts go to businesses that operate in their jurisdiction, companies can gain by generating large profits, and officials can benefit by requiring kick-backs to process a contract.

As a result, going hi-tech can attract "a wave of profiteers".[54] In Kenya, the Canadian government offered to help secure the loans needed to pay for the introduction of digital equipment in 2013, but only if it was purchased from an approved company under Canadian supervision. This practice was highly controversial and following a review of election expenditure the Public Accounts Committee of the Kenyan parliament asked the Attorney General to institute proceedings to recover "Sh305 million from Canadian Commercial Corporation"[55] that had been paid as a "brokerage fee" as part of this process.[56] Similar issues have emerged in relation to the 2011 election in the DRC, after which a Belgium company, ZETES, was sued in Belgium for electoral fraud following claims of corruption during the procurement process of biometric voter registration kits.[57]

It is important not to exaggerate the extent of this problem. Technology has been introduced in many countries without subsequent scandals. Nonetheless, it is important to recognize that in states with a history of corruption, some of the support for digitization may be disingenuous – motivated more by a desire to open up fresh rent-seeking opportunities than to improve the quality of elections. This point is significant for the ways in which elections play out for three reasons. First, problematic procurement processes can lead to poorly-qualified companies getting contracts that they are ill-equipped to fulfil.[58] Second, faulty procurement processes often require the process to be conducted a second time, delaying the purchase of equipment so late that it cannot be effectively piloted. Third, corruption scandals that involve – or are believed to involve – electoral officials, can dramatically undermine public confidence in the broader electoral process, as in the cases of Kenya and the DRC described here.[59]

**The digital fallacy (1): more robust and better managed electoral processes**

One of the claims made for digital technology is that it can strengthen electoral processes in countries where state and electoral management bodies have limited capacities. But ensuring

that such technology is properly used is far from straight forward. On the one hand, it requires careful planning and complex logistics to ensure that data is inputted, staff are trained, and sufficient power is provided. Devices and servers must be tested and replacements have to be available if devices break down. Many of these challenges are also present when it comes to manual (paper) processes – but some are not. For example, if competitive procurement processes lead to a different company conducting voter registration than the company selected to provide the database to manage the electoral roll, it is essential to make sure that the two sets of software are compatible. In some cases this is not a major challenge, but in Malawi it took five months and considerable resources to achieve this, which left inadequate time to actually audit and clean the roll.[60] On the other hand, technology requires many other forms of human input. Code has to be written for programmes; servers have to be protected; and, digital registers have to be maintained, cleaned, and kept secure. Such realities increase the cost of an election and render them increasingly complicated processes: although considerable work has been done to simplify the user interface for new equipment, additional timelines and training requirements, not greater simplicity, are often the corollaries of digitization.

The weight of these logistical challenges means that things can and often do go wrong. For example, biometric registration or verification devices may not arrive in time, power cuts or insufficient battery life may stop them from working, and so on. The scale of these issues tends to vary at different points in the electoral cycle: as a rough rule, biometric registration has tended to work better than biometric verification, simply because the time pressure is so much more intense when millions of voters have to be processed in a single day. This was apparent in Chad in 2016, where the new register apparently eliminated much double registration, but actual voting was still chaotic.[61] In Kenya's 2013 elections, a new biometric registration process worked relatively well, delivering a register that appears to have been more transparent than any previous one.[62]

However, attempts to use this register for verification were very far from a success. Electronic voter identification kits failed at some point during the day in over half of the country's polling stations,[63] and polling staff reverted to manual registers. In turn, this process was complicated by a greater degree of uncertainty over what the definitive register actually was, since printed versions differed slightly. A new electronic results transmission system – another innovation that had not been tested or scrutinised – failed even more

comprehensively.[64] Early result transmissions recorded a remarkably high number of rejected ballots; it was then announced that the system had multiplied the number of rejected ballots by eight, though how and why has never been explained. Then, following an initial stream of results, the flow of information ground to a halt. It later transpired that a server failure had meant that the system could not cope with the "volume of data that was being transmitted".[65] A lack of time to test the system, and the failure to provide a backup, had undermined one of the core reforms designed to protect electoral integrity following the disputed election of 2007. These problems were subsequently blamed on the IEBC's "evermore compressed timelines" and lack of "sufficiently thorough preparation".[66]

Of course, this does not necessarily mean that the quality of the 2013 Kenya election – in terms of how "manipulated" it was – would have been significantly better if digital technology had not been used. The IEBC operated a manual back up – i.e. the traditional method for running an election – that kicked in when the technology failed, and argued that it performed well. The Supreme Court agreed, upholding the result. But even if the manual process did hold up – something that remains controversial – it is clear that new technology generated significant negative outcomes. First, the collapse of digital processes undermined the confidence of opposition supporters and many neutral commentators in the election, despite the findings of the Supreme Court. Second, the vast cost of the technology led to few improvements, but took money away from other potential investments, a point that we explore in greater detail below.

The technological failures in Kenya's 2013 elections were particularly high profile, but not unusual. In addition to the problems with the biometric kits already noted in Nigeria, there were also significant problems with the collation system. According to EU observers, the electronic transmission of results from state-level collation centres to the presidential returning officer via email represented the weakest part of the process.[67] These issues are not necessarily fatal. Polling staff can learn quickly and some of the problems noted in Nigeria were significantly reduced in the gubernatorial elections that followed two weeks later.[68] But it is nevertheless important to recognize that the introduction of digital technology cannot resolve the problem of weak states and electoral commissions precisely because effective implementation requires a strong and flexible administrative structure in the first place.

**The digital fallacy (2): more transparent and clean elections**

Another claim made of digitization is that it can generate cleaner polls. While this may be true in a limited sense, it is clear that many kinds of electoral manipulation defy control by digital technologies: as Marielle Debos has pointed out in the case of Chad, biometric technology 'raised hopes, but did not radically change the rules of the political game'.[69] Schedler's famous "menu of manipulation" offers dishes that are served long before biometric registration/identification becomes relevant, and the advantages of incumbency are not necessarily diminished by biometry.[70] For example, in the world's electoral-authoritarian regimes, governments often outspend, intimidate, displace and generally disadvantage their opponents, and many of these strategies are unaffected by whether or not voter identification is controlled by fingerprint, retinal scan or digital photograph.

In this sense, digitization may improve the quality of some aspects of an electoral process without actually generating an election that comes close to being credible. Uganda's 2016 elections exemplify this: voters were registered biometrically, and their identities verified. Both processes were generally successful; so too was a donor-funded system that allowed some voters to confirm their registration and identify polling stations. But the election was marked by gross disparities, with the ruling National Resistance Movement (NRM) able to spend much more, while opposition leader Kizza Besigye's efforts were hampered by his arrest and the intimidation of his supporters. Moreover, the results revealed implausibly high turnouts in NRM strongholds.[71] Digital technologies neither levelled the playing field, nor boosted opposition confidence.

Unsurprisingly, problematic outcomes have been recorded in other authoritarian contexts. For example, the case of Azerbaijan offers an apparently unintentional, and comic, insight on the ability of ruling parties to turn election technology to their own ends. In 2013, the credibility of a mobile phone app purportedly designed to communicate results was fatally undermined when it released the figures a day *before* a single ballot had been cast.[72] Nor is this the only example of a case in which the introduction of technology has been manipulated for partisan gain. In Mozambique in 2014, the regime turned biometric registration into a technique of manipulation, suppressing registration in opposition areas by sending inadequate equipment and undertrained teams.[73]

But what of countries in which elections are held in contexts that are neither fully democratic, nor as controlled by the ruling party as they are in Azerbaijan and Uganda? The way in which the political context shapes the impact of new technologies is well illustrated by a comparison between Ghana and Kenya. When Kenya first introduced biometric technology in 2013 the country had held four multiparty elections but remained very much a "competitive-authoritarian"[74] state in which the government retained effective control over a political system that Freedom House ranked as only "Partly Free". Against this backdrop, successive electoral commissions have been criticised for being subject to direct political manipulation by the government.[75] Following intense criticism of the ECK's performance in the wake of the 2007 election controversy, which triggered ethnic clashes that led to the death of over 1,000 people, it was disbanded and replaced by the IEBC.

By contrast, when Ghana began to digitize its electoral process in 2012 it had already emerged as one of the continent's leading democratic lights and was rated as "Free" by Freedom House. This process was partly driven by, and in turn contributed to, the emergence of a particularly assertive and independent electoral commission under the leadership of its widely respected chair, Kwadwo Afari-Gyan. Not only did the Commission introduce reforms, such as transparent ballot boxes, which boosted public confidence, but the fact that Afari-Gyan presided over transfers of power that brought both major parties to power also meant that he was seen to be politically neutral.[76]

These different contexts are critical to understanding the greater success of the introduction of new technology in Ghana as compared to Kenya. As we have seen, digital technology did not perform well in the Ghanaian election of 2012. However, the Commission subsequently worked to improve its protocols, providing additional training and introducing measures to allow those not recognized by the kits to vote in other ways. In some instances, this work was driven by the initiative of electoral officials determined to rebuild their reputation. In other cases, it was mandated by the courts following pressure from opposition parties and civil society groups operating in a relatively open political landscape.[77] As a result, far fewer problems were recorded with the performance of digital technology in the 2016 general elections, with no complaint logged by either party – in contrast to 2012. In turn, this helped to boost public confidence in the result, despite the fact that, in-between the two polls, Afari-Gyan had stood down and been replaced by a less-trusted and tested chair (see below).[78]

In Kenya, the period between 2013 and 2017 also saw many changes, but these did not lead to the meaningful improvement witnessed in Ghana. Following the problems of 2013, the opposition demanded that the IEBC be required to use new and improved digital systems for voter identification without the possibility of any manual back-up for the next election.[79] In 2016, the law was amended to this effect, but this was subsequently reversed to allow a 'complementary' manual system at the insistence of the ruling party.[80] The opposition protested furiously, but unsuccessfully: as one prominent politician put it '[w]e wanted technology to ensure ourselves of credible polls'.[81] The 2017 elections did, however, feature brand new technology in the shape of the Kenyan Integrated Electoral Management System, or KIEMS, kits. This system, supplied by the French firm OT Morpho – in a procurement process that raised questions due to the absence of a competitive process – allowed electoral officials to use the same piece of equipment to biometrically verify voters and then to transmit the results both as a typed in number and as a digital image of the official results form signed by electoral officials and party agents.[82] The logic of having two forms of digital results – and three overall – was that each would act as a check on the other.

Right up to the elections, held in August 2017, the opposition maintained their faith in digital technology,[83] and public confidence also remained high: 'the gadgets should work flawlessly and the elections should be free and fair', declared one optimistic voter.[84] Indeed, initial indications suggested that the new model had performed well. In stark contrast to 2013, the domestic monitoring team found that KIEMS kits were present in 97% of polling stations and worked in 92% of those. Moreover, results quickly began to flow in to the online system, which was connected to a new – and impressive – website that allowed citizens to search results to the polling station level. However, as more information about the election began to trickle out, it transpired that some parts of the system had not been strengthened. Most notably, around a quarter of the scanned forms were not transmitted and made available by the time that the election result was announced. It also transpired that the passwords of senior election officials were used to access the system thousands of times – potentially by different people. Taken together with the refusal of the IEBC to provide information and access to its servers and other unexplained events – most notably, the murder of Chris Msando, the IEBC's acting heading of information technology less than a week before the polls[85] – compounded issues of limited transparency and were enough to undermine the credibility of the election. Although the Court did not determine whether the

president received less votes than his rivals, a majority of judges ruled that the procedural limitations of the election – many of them digital – were sufficient to render it illegal.

It is still not clear exactly what happened in the weeks leading up to the polls to generate this outcome, but statements from key players suggest that once again procedural improvements had been undermined by political interference. Following the nullification of the presidential election, first one of the Commissioners, Roselyn Akombe, and later the Chair of the Commission, Wafula Chebukati, broke ranks to complain that essential reforms were being blocked as a result of direct government interference in the inner workings of the electoral body.[86]

We therefore have strong evidence that the comparatively successful bedding-in of digital election technology in Ghana and the continued failure of technology to generate credible elections in Kenya are rooted – if not fully explained – in variations in the quality of democracy and the political independence of the electoral management body. As Cheeseman and Klaas have argued, when electoral commissions operate under the influence of the ruling party, 'making the most of new technology will require it to be transferred into the hands of independent civil society groups and opposition parties'[87] – a point to which we return below.

The Kenyan case is also instructive because it highlights the way in which the opaque nature of digital technologies may undermine public confidence in electoral processes even when they generate considerable improvements. When opposition leaders rejected the official results in August 2017, they did not just suggest that there had been a number of specific problems; rather, they alleged that the digital system had facilitated rigging, that the whole system had been hacked, and that all of the results were 'computer-generated'.[88] This accusation resonated with opposition supporters, whose confidence in elections had been eroded by past experience and recent events, including Msando's murder and questions over the IEBC's procurement processes. At the same time, the limited knowledge of many citizens and commentators regarding how digital processes actually work meant that it was extremely difficult to differentiate false claims from plausible ones. This was revealed in comical fashion when the opposition claimed to have a print-out of the log of activity on the IEBC's servers and distributed it at a press conference only for none of the media, analysts and observers present to have the skills necessary to be able to tell if it was genuine. [89]

It later transpired that the data could not substantiate the claim of hacking (which is not to say that it did not occur), but this was long after reports of the accusation had been

circulated. Unsurprisingly, ordinary citizens were no more confident that they knew what was going on than those employed to cover the process. A nationally representative survey conducted by IPSOS Kenya two months after the election found that just over half of all respondents felt that they "mostly don't understand" or "don't understand at all" what happened during the process of vote counting, and that only a minority of Kenyans (49%) believed that the victorious candidate had "really won". Thus, the use of new and improved digital processes did little to boost either the credibility of the polls, or public confidence in the legitimacy of the outcome. It is therefore important to keep in mind that the loss of transparency, which Yard argues often goes hand-in-hand with digitization,[90] may have a particularly detrimental impact on public confidence once rigging is alleged.

Of course, technology does not always fail when introduced into difficult conditions, and there have been some less negative experiences in equally challenging circumstances, such as Nigeria in 2015. However, as we note above, the claims made for digital technology in that country have been overblown. Moreover, one reason that effectively rolling out new systems is particularly challenging in the Nigerian context is that the chair of the electoral commission does not actually control all relevant appointments. Instead, it is the president who determines the Resident Electoral Commissioners who play a significant role in coordinating elections at the state level.[91] Given this, it is clear that even some of the less problematic cases demonstrate the significance of the quality of democracy, and the independence of key institutions, to the efficacy of digitization.

**Opportunity costs and the risk of complacency**

A final problem with the use of digital election technology is that when it is treated as a silver bullet, international donors and opposition parties may become complacent about the threat of rigging and pay less attention to other forms of detecting and deterring manipulation. This is particularly problematic given the potential for political interference to subvert the role of the electoral commission, and hence digital processes.[92] Significantly, the great cost of new technology described above often means that there is less space in donor budgets to fund other projects. As a Democracy Reporting International report notes, while electronic voting machines cannot "prevent intimidation, vote buying, media bias, low participation by women,

the abuse of state resources by incumbent parties or endemic political and electoral violence . . . their enormous financial costs and the changes involved with their use . . . divert energies and funds from addressing these fundamental issues".[93]

In other words, digitizing elections carries an opportunity cost, rendering other options financially or practically unfeasible. As a result, alternative areas of investment, such as domestic observation groups, often find that their requests for more substantial financial assistance are denied. For example, when donors decided to fund an expensive digital voter registration process ahead of the DRC's 2011 elections they simultaneously cut the number of international observers with the EU sending 112 to cover the entire country, down from the 300 observers that had been supported in 2006.[94] While this correlation does not prove causation, the extent to which this pattern holds in a number of different countries is strongly suggestive. Moreover, donor representatives involved in electoral support work in Kenya and Zimbabwe told the authors that given a limited funding envelope, purchasing expensive equipment inevitably means they are forced to invest fewer resources in domestic observation unless there are exceptional reasons to increase the overall budget such as new democratic openings.[95] This problem is not only a financial one, but also one of time and attention. Managing an election, or a donor project to support an election, is usually a stressful activity, with many things that must be done and not enough time to do them. In this context, introducing a new procurement process risks monopolizing the time and attention of a high number of officials within multiple organizations.

The high opportunity costs of supporting digital technology are compounded by the tendency for election technology to engender a sense of complacency. The deep-seated belief in technology as a cure-all encourages an unwarranted degree of optimism in the likely quality of the polls. Ahead of the Kenyan elections of 2013, for example, the faith that opposition parties placed in technology went hand-in-hand with insufficient attention to the need to establish an effective system of party agents. After all, if technology can be relied upon to provide an effective check on the activities of the electoral commission, why go to the difficult and expensive task of building an effective party machine to duplicate the effort? Partly as a result, party leaders did not invest enough in internal party structures and failed to adequately monitor this process, with the result that a considerable portion of the funds was wasted when it was siphoned off by "middle men".[96] Along with other logistical challenges such as the need to coordinate across numerous coalition members and the difficulty of

locating agents in ruling party strongholds, this contributed to a situation in which the opposition did not place a party agent in over 10 per cent of polling stations.[97]

The lack of attention and funding devoted to domestic monitors and party agents is particularly problematic if digital technology fails and electoral commissions revert back to manual processes. When this happens, opposition parties and donors often find that their focus on new technology has actually undermined their capacity to detect fraud. Following Kenya's 2013 elections, for example, the opposition alleged that the technological failures were a deliberate strategy to facilitate the rigging of the election, but struggled to evidence this claim, in part due to the limited reach of its network of party agents.[98]

Significantly, opposition parties were not the only ones to place most of their eggs in the technology basket; many international donors did likewise. In Kenya's 2007 election, domestic and international monitoring had faced multiple challenges, but effectively highlighted a number of instances of electoral manipulation, which led to the European Union going public with its evidence. Despite this, and the danger posed by electoral controversy, the number of observers was reduced. This was publicly justified on the basis that a smaller team could be more coherent and organized – the 2007 monitoring process had often been chaotic – but was also shaped by the fact that a considerable portion of donor budgets was diverted to new technology. While precise figures are hard to come by, the EU has suggested that the Kenya Domestic Observers Forum was 17,000 strong on polling day in 2007, while only just over 7,000 were deployed by its replacement, the Elections Observation Group (ELOG) in 2013.[99] In this way, the use of digital technology may lead to disinvestment in other areas that render elections more vulnerable to manipulation, not less.

By contrast, the value of not relying on official digital technology was demonstrated by the Ghanaian general election of 2016. In the run-up to the elections, the opposition New Patriotic Party (NPP) had challenged the reliability of the register, arguing that non-citizens had been allowed to register. Concerned about the impartiality of the new Chairperson of the Electoral Commission, Charlotte Osei, the NPP kept up a barrage of criticism of the electoral management body.[100] As a result, the opposition party put extraordinary energy into recruiting and training agents and creating their own tallying system.[101] This meant that as soon as the election was over the NPP was able to put together a full set of results – including photos of the "pink sheets" on which they were recorded at the polling station level. In the event, this evidence was not needed because the official results gave the NPP victory.

However, some opposition figures believe that it was the existence of their high quality parallel tally that prevented electoral manipulation.[102] Whatever the truth of the matter, it is clear that by operating independently and creating a system that would have worked even if official processes had failed, the network of party agents established by the NPP generated a check on manipulation than was in some ways more robust than that offered by the electoral commission's digital technology.

**The challenge of safeguarding elections in new democracies**

This article has documented some of drivers that account for the rise of official election technology in new democracies, and raised a number of questions about its effectiveness when it comes to generating better managed, more transparent and cleaner elections around the world. Against some more optimistic analyses,[103] we have argued that although digital technologies have much to offer, they often fail to live up to expectations.

On the one hand, even the most advanced forms of technology depend on human input to no lesser extent than manual election management and are in certain cases actually more vulnerable to manipulation. Significantly, this risk is exacerbated by the difficulty of monitoring "black box" digital processes, especially in counties in which the ruling party is able to exert control over the electoral commission. On the other hand, the procurement and operationalization of new equipment represents a major logistical task that many electoral commissions struggle to perform. The tendency for new technology to break down is particularly worrying given that the use of digital equipment tends to crowd out investment in other areas and can engender a sense of complacency. Consequently, when digital systems fail, opposition parties, monitors, and donors typically find that they have weak back-up systems at their disposal.

It is tempting to conclude that the best way out of this conundrum is to simply do everything. International donors could, for example, support both digitization and an expansion of domestic election monitoring. However, this is unrealistic given the high costs of technology. Most new democracies now spend far more on holding elections than their Western counterparts, leaving few resources to be invested elsewhere. In the context of growing pressure on aid budgets, there appears to be little appetite to increase the budget

for electoral support enough to fund a broader range of activities. It is therefore important to either improve the chances that digital technologies will work, or to avoid using them.

This conclusion should not be taken to imply that technology is bound to fail, or that there are no good arguments in favour of its deployment. As we have argued, biometric *registration* processes are less prone to breakdown because they take place over a longer period of time, and have helped to improve the electoral roll in a number of countries such as Nigeria and Kenya.[104] We have also seen that digital processes may generate meaningful improvement in democratizing states when the electoral commission has achieved a greater degree of political independence and authority, and that the efficacy of new technology can improve over successive elections in more supportive political environments, such as Ghana. This suggests that digitizing elections may be more successful in regions in which neo-patrimonial networks have done less damage to the autonomy of formal political institutions.[105] It is also possible that further gains can be secured by varying parameters that we do not have the space to address in this paper, such as the modality through which digital processes are funded and managed.

What our argument does call for is a serious re-think of the value added by digital technology, and the conditions required for it to work. The evidence thus far suggests that digital technologies are far less likely to deliver meaningful improvements in some of the competitive-authoritarian contexts in which they are most needed. Given this, digitizing elections should not be the default policy of opposition parties, civil society groups and international donors. Instead, more attention needs to be paid to the risk of failure given the political landscape in the country concerned. There are some early signs that this message is starting to be understood. For example, opposition parties have rejected the introduction of electronic voting machines in the DRC, arguing that they would simply be used to legitimate – and facilitate – rigging.[106] Adopting this more sceptical approach systematically will involve all actors involved routinely asking a number of tough questions, and answering them honestly. Does the electoral commission have the logistical capacity and political independence to carry out such an operation? Can checks be put in place to minimise the risk of government manipulation? Does the local expertise exist to allow this process to be effectively monitored? Unless the answers to these kinds of questions are favourable, digitizing elections is likely to be at best a waste of resources and at worst a costly mistake: that is the digital dilemma facing democracy promoters.

## Notes

[1] Pommerolle, Perrot, and Willis, “La fabrique du vote”, 5, 2016.
[2] Yard, “Direct democracy”.
[3] *Ibid*., 12.
[4] Evrensel, “Introduction”, 2.
[5] Akumiah, “Democratic Republic of Congo”, 98.
[6] Barkan, “Kenya’s 2013 elections”; Wrong, “Africa’s election aid fiasco.”
[7] Montjoy, “The changing nature”.
[8] Carlos et al, “Democratic Deficits in the Philippines”; Carter Center, “Limited election observation mission to the Philippines”.
[9] Ishkanian, “Armenia’s election”; Gelb and Clark, “Identification for development”, 33.
[10] Yard, “Direct democracy”, 12.
[11] Piccolino, “Infrastructural state capacity for democratization?”; Debos, “Biométrie au Tchad”.
[12] Githongo, *Africa Confidential,* 9 September 2016.
[13] Gonggrijp et al., “Nedap/Groenendaal ES3B voting computer”.
[14] Pommerolle, Perrotm and Willis, “La fabrique du vote”.
[15] Willis, Lynch, and Cheeseman, “La machine électorale”, Dec. 2016.
[16] Glidden, “Election monitoring, technology and the promotion of democracy 2000”, 359.
[17] *Ibid*, 360, 362.
[18] Shackleford, 629.
[19] Ford, 2014.
[20] Harvey, “The fetish of technology”, 3.
[21] Gelb and Clark, “Identification for development”, 53.
[22] *Zetes PASS*. “Data protection and confidentiality,” accessed April 2017.
[23] Malloch-Brown, “Foreword”; See also Antony Mugica, “The Case for Election Technology.”
[24] Ferguson, *The anti-politics machine.*
[25] *Morpho*,“Government ID solutions,” accessed July 2017.
[26] Ishkanian, “Armenia’s election”.
[27] Brigalia Bram, “Digitising Democracy in Africa”, accessed April 2017.
[28] Rader, “Politiques de la reconnaissance et de l’origine controlee”, 58; do Rosario and Muendane, “’Se faire recenser? Oui, mais voter?’”, 89-92; Szreter and Breckenridge, “Recognition and Registration”.
[29] For professional reasons, the individual preferred to remain anonymous.
[30] Stein et al., “Voting Technology, Election Administration”.
[31] Harvey, “The fetish of technology”, 3.
[32] Scott, *Seeing like a State*, 4.
[33] World Summit on the Information Technology, “Basic Information: About WSIS”, 2015, accessed 9 November 2017, http://www.itu.int/net/wsis/basic/about.html.
[34] Raboy, “The World Summit”, 226.
[35] Alvi, “Proceed with caution” 135-36.
[36] For professional reasons, the individual preferred to remain anonymous.
[37] CODEO, *Promoting a Peaceful, Transparent and Credible Process*; Piccolino, “Infrastructural state capacity for democratization?”
[38] Brierley and Ofosu, “The presidential and parliamentary elections”.
[39] Golden et al., “Patterns of Breakdowns in Biometric Identification”.
[40] Pryce and Oidtmann, “The 2012 general election in Ghana”.
[41] Interviews GHA14, retired judge, Ghana, 10 September 2015; GHA10, Trade Unionist (Ho), 8 September 2015; GHA20, former presiding officer, 26 August 2016; GHA23, NDC constituency secretary, 26 August 2016.
[42] Interview, GHA18, former MP (NPP), 25 August 2016. In fact, the UK employs no such election technology and is largely a “manual” process.
[43] Commonwealth Observer Group, “Nigeria elections 2015.”
[44] Cheeseman, *Democracy in Africa.*
[45] Rader, “Politiques de la reconnaissance et de l’origine controlee”, 56-57.
[46] Hosein and Nyst, *Aiding surveillance*, 21; McElroy in the *Telegraph* 16 October 2011
[47] Orji and Iwuamadi, “Conflict Mitigation in Nigeria’s 2015 Elections.”
[48] EU, “Final Report: General Elections 2015”, 27; Nwangwu, “Biometric Voting Technology”.
[49] Barkan, “Kenya’s 2013 elections”, 160.
[50] Akumiah, “Democratic Republic of Congo”, 58.
[51] Gelb and Clark, “Identification for development”, 34.
[52] Rader, “Politiques de la reconnaissance et de l’origine controlee”, 59.

[53] Hosein and Nyst, "Aiding surveillance".
[54] Barkan, "Kenya's 2013 elections", 165; do Rosario and Muendane, "'Se faire recenser? Oui, mais voter?'", 79-82.
[55] Ngetich and Ayaga, *The Standard*, 23 March 2016.
[56] Kamau, *AllAfrica*, 1 April 2017.
[57] Kalombo, *Congo Independent*, 20 July 2010.
[58] do Rosario & Muendane, "'Se faire recenser? Oui, mais voter?'", 81, 83-84.
[59] Ohito David, "Why IEBC commissioners had to go".
[60] Interview, electoral expert, Harare, Zimbabwe, 11 February 2018.
[61] Debos, "Biométrie au Tchad'.
[62] Cheeseman, Lynch and Willis, "Democracy and its discontents", 13.
[63] ELOG, "The Historic Vote", 60.
[64] Barkan, "Kenya's 2013 elections".
[65] Ibid, 163.
[66] EU, "Final Report: General Elections March 2013", 12.
[67] EU, "Final Report: General Elections 2015", 27.
[68] Nwangwu, "Biometric Voting Technology".
[69] Debos, "Biométrie au Tchad".
[70] Schedler, "The menu of manipulation"!; Levitsky and Way, "The rise of competitive authoritarianism".
[71] EU, "Election observation delegation Uganda", 2016.
[72] Fisher, *The Washington Post,* 9 October 2011.
[73] do Rosario and Muendane "'Se faire recenser? Oui, mais voter?'", 83-87.
[74] Levitsky and Way, "The rise of competitive authoritarianism".
[75] Branch and Cheeseman, 'Democratization, sequencing and state failure'.
[76] Cheeseman, *Democracy in Africa*.
[77] Cheeseman, Lynch, and Willis, "Ghana: The ebbing power of incumbency".
[78] *Ibid*.
[79] 'Raila's plan to seal rigging loopholes in 2017 elections', *The Star,* 27 July 2016, https://www.the-star.co.ke/news/2016/07/07/video-railas-plan-to-seal-rigging-loopholes-in-2017-elections_c1381863
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[82] 'IEBC has questions to answer on how it chose electronic kits supplier', *Daily Nation,* 21 April 2017 http://www.nation.co.ke/oped/opinion/--IEBC--on-how-it-chose-electronic-kits-safran/440808-3898436-sqc2hs/index.html
[83] 'Use biometrics, cancel al-Ghurari tender and I'll accept result: Raila', *The Star*, 15 July 2017, https://www.the-star.co.ke/news/2017/07/15/use-biometrics-cancel-al-ghurair-tender-and-ill-accept-result-raila_c1597018; also 'Compel IEBC to use e-systems: NASA', *Daily Nation*, 11 July 2017, p. 5.
[84] 'Kenyans optimistic IEBC will conduct credible elections today', *Daily Nation*, 8 August 2017, p. 3
[85] 'NASA worries that the results transmission system will be hacked', 1 Aug. 2017, http://www.nation.co.ke/video/1951480-4040812-ajtopw/index.html
[86] Cheeseman & Klaas, *How to Rig an Election*.
[87] Ibid, p. 181.
[88] In some cases, the digital results did not match what was on the original forms. 'We will not accept computer-generated leaders, Raila says as NASA opts to go to court', *The Standard*, 16 Aug. 2017https://www.standardmedia.co.ke/article/2001251594/we-will-not-accept-computer-generated-leaders-raila-says-as-nasa-opts-to-go-to-court
[89] 'Elections 2017: Raila Odinga says IEBC database hacked and results altered', *The Standard*, 9 Aug. 2017, https://www.standardmedia.co.ke/article/2001250797/election-2017-raila-odinga-says-iebc-database-hacked-and-results-altered
[90] Yard, "Direct democracy".
[91] European Union, 'Final report'.
[92] Cheeseman & Klaas, *How to Rig an Election*.
[93] DRIR, "Electronic voting machines", 3.
[94] McElroy, *The Telegraph,* 16 October 2011.
[95] Interviews in February 2018 in Nairobi and Harare. In both cases the officials asked to remain anonymous.
[96] Interview, ODM activist, Nairobi, 8 April 2017.
[97] ELOG, "The Historic Vote".
[98] The opposition's electoral petition was ultimately rejected by the Supreme Court. The petition was also encumbered by tight time frames and a general desire to ensure that the polls were peaceful (Harrington & Manji 2015).
[99] EU, "Final Report: General Elections 27 December 2007", 1, 3; EU, "Final Report: General Elections March 2013", 3, 28.
[100] Oppong, "Ghana's 2016 election results".
[101] Cheeseman, Lynch, and Willis, "Ghana: The ebbing power of incumbency".

[102] Interview GHA 104, NPP election advisor, Ghana, 5 December 2016.
[103] Gelb and Diofasi, *Biometric Elections in Poor Countries.*
[104] Although it is important to note that in the Kenyan an independent audit conducted by KPMG identified a number of problems including the possibility that there were over 1 million "dead voters" on the register.
[105] Cheeseman, *Institutions and Democracy in Africa*.
[106] Daily Nation, 2018.

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